



Grant Agreement no. 317916

LiPhos

Living Photonics: Monitoring light propagation through cells

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OBJECTIVE: ICT-2011.3.5

D6.2 Initial Dissemination Plan

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RE	Restricted to a group specified by the consortium (including Commission Services)	
CO	Confidential, only for members of the consortium (including Commission Services)	

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1. Introduction

The consortium firmly intends to disseminate the results from the LiPhos project to a very wide audience. With technology providers, manufacturers and end users all involved in the project, the diversity regarding where the project information can be publicised is extensive. The principle aim of this activity is to disseminate research results to the public and relevant actors in the field, and to promote awareness and acceptance of the LiPhos technology and its benefits. However, within the project, dissemination activities will always be tempered by the requirements to safeguard intellectual property as this will have a significant impact on the exploitation of the project results and commercial viability of any resulting product. The dissemination element of the project is also important for its role in preparing the marketplace and favourable conditions for broad adoption of LiPhos technology.

The LiPhos dissemination strategy is based on the objectives of the project, the stakeholders within the consortium and the requirement to significantly impact the market. The technological advances throughout the project need to be disseminated to the scientific community while the benefits of the technology need to be promoted to the end users as well as potential collaborators for future product development of biophotonic diagnostic tools (BDTs) in all the different possible applications.

In deciding on a dissemination strategy for LiPhos, all these factors have been taken into account. As a result, the dissemination strategy comprises a matrix of three distinct groupings:

1. Dissemination methodologies targeted at the specific audiences (scientific, academic, general public).
2. Promotion through various public sector health associations/agencies, focusing in particular on cardiovascular disease (CVD).
3. Networking with user groups, conference and trade show organisers, etc.

To enact this strategy, LiPhos is engaging the stakeholders in a variety of ways including:

- Conferences and workshops targeted at specific stakeholder groups.
- Scientific publications.
- General publications targeted at specific stakeholder groups.
- Participation in relevant EU activities (e.g. concertation meetings, ICT summits, interaction with other European Projects, etc.).
- “Open house” activities/demos to present the test-bed and the technologies to specific audiences (e.g. specialized industries, user groups, public health agencies) – the European Platform Industry Consortium (EPIC) has agreed to provide active support on preparing this event.
- Integration of the main scientific results and methodologies in the advanced graduate courses/seminars taught at the universities of the academic partners. In addition, there will be opportunities for research projects/graduate theses for the students in these universities on topics related to the proposed research.
- Dissemination through other relevant Research Projects belonging to National Excellence Programs, where there are interesting synergies. For example, we could submit a presentation on LiPhos to the national MicroNano conference in December 2013. This conference is supported by the NanoNext funding program within the Netherlands as well as the MinacNed association of SMEs in micro and nanotechnology. Dr Henk Leeuwis at Lionix is a board member of the latter organisation.
- Project website.
- Flyers and other project literature.

From its dissemination activities, LiPhos seeks to develop a distinctive “corporate” image, including a logo and presentation templates, which are easily identifiable by all the interested stakeholders. The particular nature of the project and its natural evolution shall be reflected in this strategy and changes to some of the activities set out in this document may be necessary during the lifetime of the project. The project will endeavour to be both effective and efficient in its dissemination activities. This will involve an on-going review of the methods employed and changes and updates as necessary.

2. Dissemination Strategy

To set the scene for the LiPhos dissemination strategy, it is important to understand the project objectives and some of the issues facing the healthcare industry and potential impact on the community. The problem of healthcare provision in general, and cardiovascular disease in particular, is a global challenge for the future years. CVD is the main cause of death within the EU, being responsible for around 48% of the deaths every year and with overall estimated costs to the economy of €192 billion a year [European Cardiovascular Disease Statistics, 2008] Hence LiPhos can make a major economic and societal impact, putting Europe at the forefront of this new technology. Considering that both the pharmaceutical and medical market is progressively tending towards biophotonics, the social impact of LiPhos is expected to be even higher in the medium term.

While it is very important to disseminate the results of the project as widely as possible, consideration must also be given to any confidential information, the public dissemination of which could impact any future patent applications. Therefore, all dissemination will follow the publication clearance procedure specified in the Consortium Agreement and in the Project Handbook.

Basic research will be disseminated through the normal scientific and academic route of peer reviewed publications. Within LiPhos, it is expected that the new results obtained on the cell-based photonic systems and the photonic fingerprint (PIN) will provide the greatest majority of these publications. It is also expected that the project will promote itself through journals, conferences, trade magazines, trade shows and networking events. Aspects of these are discussed later in the document.

Dissemination to the general public is multifaceted. This comprises raising the general awareness of the worldwide health issues, the progress being made in the project and the potential of the technology for everyone. To achieve this, a number of dissemination routes have been identified:

- LiPhos website
- Project flyer
- Multilingual press releases
- Attendance at international conferences
- General press coverage – TV, radio, national and local press

The attainment of the dissemination strategy can be achieved through the establishment of links with distinct but overlapping target groups and end users, such as trade associations, patient support groups, policy makers, healthcare providers, industrial and research entities. The methods through which LiPhos can reach these target groups involves varying approaches that can be grouped as either clustering activities with other on-going actions/projects, or through conference activities, either at periodic venues or specific LiPhos organised and sponsored events.

Within the LiPhos consortium, there are two commercial end-user partners focused on microfluidic pumping solutions and consumable biochips for cell-based assays (Cellix) and Lab-on-a-Chip and optical sensing systems for applications including life sciences (Lionix). Many dissemination activities targeted at industry will be co-ordinated through Cellix and Lionix, with input from the other partners as necessary. There is also a clinical centre partner (CNIC) specialised in scientific research, translational medicine and training for CVD applications. CNIC have links with major CVD organisations such as HOSPITAL CARLOS III, Spanish Society of Cardiology, Spanish Atherosclerosis Society, Spanish Cardiovascular Research Network-Instituto de Salud Carlos III, European Society of Cardiology, etc. which will be used for disseminating the project findings. This will also be endorsed by the European Photonics Industry Consortium (EPIC), which will provide access to most biophotonic companies in Europe. Representatives of these organisations will also be invited to networking events with the objective to obtain feedback on LiPhos-related research needs and commercial opportunities.

During the first 24 months of LiPhos, a set of promising end-users will be identified and contacted in order to evaluate and understand their potential interest and capability for collaborating with the project. The process will be organized as shown in the following table:

End-User Name or Type	Country	Domain	Type of action performed by LiPhos
Academic vascular biology groups in the Netherlands (Ingrid Molema at RUG is a member of one of these).	The Netherlands	Research	Collaboration with respect to testing of the technology in different labs pursuing research on specific vascular biomedical questions. Would help validate the technology
Niels Henrik Buus and the group on Cardioprotection, Aarhus University Hospital, Skejby are partners or collaborators of Prof. Ulf Simonsen at AU.	Denmark	Research and clinical work	Contribute to validation of technology
Roche	Germany	Exploitation	Present results and discuss knowledge transfer
Agfa Healthcare	Germany	Exploitation	Present results and discuss knowledge transfer
European Photonic Industry Consortium (EPIC)	Europe	Dissemination	Dissemination within Europe
CVD associations	Europe	Clinical testing – establish whether LiPhos technology could actually have an impact on early diagnosis and treatment of CVD	Provide prototype systems for evaluation
Medical insurance companies	Europe	Dissemination	Dissemination within Europe

A number of deliverables will be publicly disseminated, and these will be made available on the project website (see below). Furthermore, public abstracts of some of the key confidential deliverables will also be produced.

2.1. Exploitation, Impact and IP Sub-committee (EIIS)

An Exploitation, Impact and IP Sub-committee (EIIS) will be setup to monitor these aspects, comprised of a relevant subset of partners. Consideration will also be given to appointing an external expert to this sub-committee at a later stage of the project, if deemed relevant. The sub-committee will review key performance indicators and give feedback on the commercial and impact success of the project. It will provide reports to the Executive Committee at least annually. Its remit will cover:

- Commercialisation
- Standards
- Management and protection of Intellectual Property
- Dissemination
- Identification of exploitable project results
- Market analysis
- Identification of business opportunities
- Identification of risks

Further details of exploitation activities will be provided in an Exploitation Plan to be produced at a later stage during the project. For now, it is sufficient to note that, as part of exploitation, there may be some dissemination to other companies who may ultimately be interested in using or licensing the technology.

3. Dissemination Methodologies

3.1. Journals / Conferences

Raising awareness of the LiPhos project and its results to relevant stakeholders is an important feature of the project. The strong multidisciplinary character in LiPhos provides a wealth of channels for distribution of relevant information.

Partners have been successful in the past in publishing in top journals and conferences in their areas of research, and it is expected that the same will happen in the context of this work. In particular:

- Results related to *in vitro* arterial models will be presented at relevant conferences and workshops such as: European Society of Cardiology, Spanish Society of Cardiology, Spanish Atherosclerosis Society etc. Similarly, this work will be published in top journals such as: Circulation, Circulation Research, Cardiovascular Medicine, Atherosclerosis, Immunity, Nature Medicine etc.
- Results related to biophotonics will be presented at relevant conferences and workshops such as: SPIE Optics + Photonics, Optofluidics etc. Similarly, this work will be published in top journals such as: Optics Letters, Applied Physics Letters etc.
- Results related to microfluidic developments will be presented at relevant conferences and workshops such as: Lab-on-a-Chip World Congress, Micro Total Analysis Systems (μ TAS), IEEE MEMS, Transducers etc. Similarly, this work will be published in top journals such as Lab-on-a-Chip, Analytical Chemistry, Biosensors and Bioelectronics, Biotechnology and Bioengineering, Clinical Chemistry, Nature Methods etc.

- Finally, results and information related to the overall project application will be presented at application-specific conferences and international healthcare symposia such as International Conference of the Engineering in Medicine and Biology Society (EMBS), Microsystems for Medicine and Biology etc. Where relevant, conference sessions will also be proposed at such international symposia in a later phase of the project. Similarly, this work will be published in top journals such as Nature Photonics, Journal of Biomedical Optics etc.

The majority of the conferences mentioned above are extremely competitive and generally have low acceptance rates. Technical papers that are accepted for publication to conferences are accompanied by a technical presentation outlining the core of the proposed solution, the improvement over the state-of-the-art, and a solid evaluation, demonstrating the validity of the proposed ideas and technologies.

3.2. Participation in program committees and editorial boards

Through such a position, participants of LiPhos will be able to play a role in setting the agenda and organising special sessions or special issues. Some examples of relevant affiliations are given below:

The Coordinator, Dr. Andreu Llobera (CSIC-CNM), is a technical program committee member of the following conferences: μ TAS, IEEE MEMS, Transducers.

Prof. Verpoorte (RUG) is heavily involved in the μ TAS organization and is a member of the Analytical Chemistry Editorial Advisory Board where she can suggest topics for special focus or review articles, which could include topics around LiPhos, subject to consideration of any potential conflict of interest.

Prof. Ulf Simonsen (AU) is editorial associate or on the editorial board in several journals (Journal of Vascular Research, Pharmacological Reviews, Basic and Clinical Pharmacology) where the possibility exists to propose reviews etc. on themes related to the LiPhos project. Those will be subjected to peer review in the usual way and do not create a conflict of interest.

3.3. Workshops and Trade Shows

In strong collaboration with EPIC, a series of workshops will be held towards the end of the project, in which organisations and end users related to the photonic and healthcare industries will be invited and given briefings on the technologies developed. The industrial partners will also take part in several exhibitions and trade shows targeted to industry where the LiPhos results will be disseminated. The first workshop will be held around April 2015 with at least one further workshop before the end of the project.

3.4. Project Logo

Although not a dissemination mechanism in its own right, the logo of the LiPhos project (shown below) is very important as it gives the project an identity. The logo is used on all LiPhos documentation and at all dissemination events. The logo of the project was designed during the first months of the project. An animated version has also been produced for use on the project website and in PowerPoint presentations.



Figure 1: LiPhos logo.

3.5. Project Factsheet

A project Factsheet (Figure 2) was produced, as required at the beginning of the project, and submitted to the Project Officer. This is mainly to be used for dissemination by the EC and for inclusion on their website, but it can also be used by partners as necessary.





Living Photonics: Monitoring light propagation through cells (LiPhos)

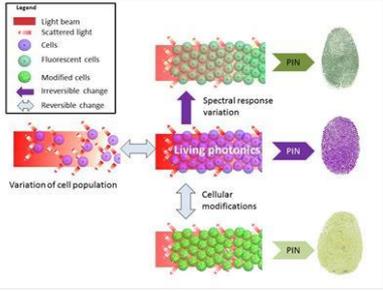
LiPhos Project
 The LiPhos project will develop biophotonic diagnosis tools (BDTs) in which cells are, for the very first time, used for defining the core of the waveguide, giving rise to the "Living Photonics" concept. Measurement protocols will consist of the determination of the Photonic Fingerprint (PIN) of the biological system under study and will be applied to the diagnosis of cardiovascular disease (CVD).

Background / Motivation
 Photonics has emerged as a unique, extremely powerful technology for contactless real-time analysis in the life sciences and medicine. This is a reflection of the fact that using light as an interrogation mechanism in life sciences has major advantages, such as high sensitivity, non-destructive measurement, small or even non-invasive analysis and low limits of detection (LoD).
 Biophotonics is powerful and mature enough to provide the next generation of diagnosis and prognosis tools. Nevertheless, the combination of technologies such as microfluidics and photonics will be required to enable the real time measurement of relevant analytes in very small sample volumes.
Objectives
 The main objective is the integration of new biophotonic functionalities and development of breakthrough diagnosis tools based on the living photonics concept and following a user-driven application-specific approach. In addition, the PIN of the cell culture (which will include information regarding cell population, spectral response and morphology) will be studied to obtain an unprecedented level of detailed information for the diagnosis of CVD. Finally, pre-clinical validation of the cell-based photonic systems for diagnosing CVD will be carried out.
Project Description
 LiPhos is focused on the development of innovative biophotonic diagnostic tools using cells as the constituent material. In this context, cells play a two-fold role:

i) they form a biomaterial with higher refractive index than the surrounding media, thus defining the waveguide; and
 ii) they are interrogated by the light coupled into them, and act as reporter elements to exhibit a unique spectral response. The advantage of this configuration is a highly-efficient cell-light interaction, making it possible to diagnose diseases by measuring the photonic fingerprint (PIN). This key parameter, newly introduced in LiPhos, is the spectral response of the living photonics and includes the different inherent or acquired bands (scattering, absorbance and/or fluorescence) directly related to the cell culture or tissue under study. This is highly specific, since healthy and non-healthy cell cultures or tissue will yield different PINs when used as waveguides. This groundbreaking method will give rise to a powerful analytical tool, which could be applied to study and diagnose a disease at the cell culture or tissue level.

The ultimate aim of the LiPhos project is the diagnosis of CVD. This target will be addressed by first obtaining and comparing the PINs of adherent cell layers cultured under controlled conditions, and representing diseased or healthy states. At a later stage, the LiPhos concept will undergo pre-clinical validation as a diagnostic tool for CVD, using arterial segments obtained from patients with known endothelial dysfunction.

LiPhos provides an innovative and potentially game-changing opportunity to reduce both the social and financial impact of CVD, as well as huge market possibilities to the companies involved.



The expected project impacts, societal & economic benefits can be summarised as follows:

- High performance and functionality: the cell-based photonic systems will provide a revolutionary tool for acquiring real time key information, which could be applied to investigating biochemical and metabolic processes at the heart of various physiological and pathological conditions.
- Novelty and potentiality: no other research groups or companies across the world have yet started developing this new generation of photonic systems and thus this approach is currently world-leading with a clear potential for patents and spin-offs.
- Multidisciplinary, component size and cost reduction: the synergistic combination of key research fields (photonics, microfluidics and cell biology) in a highly multidisciplinary approach will provide for the very first time an extremely compact, photonic lab-on-a-chip system suitable for performing real time multiparametric screening of cell cultures and hence obtaining their PIN.
- Socio-economic impact: CVDs are the main cause of death within the EU, being responsible for around 48% of the deaths every year and with overall estimated costs to the economy of €192 billion a year [European Cardiovascular Disease Statistics, 2008 edition]. Hence LiPhos can make a major economic and societal impact, putting Europe at the forefront of this new technology.

Regular updates on results will be published through conferences, journal publications and through the LiPhos website.



Living Photonics: Monitoring light propagation through cells (LiPhos)

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- Rijksuniversiteit Groningen (RUG) – Netherlands
- Aarhus Universitet (AU) – Denmark
- Dublin City University (DCU) – Ireland
- Fundacion Centro Nacional De Investigaciones Cardiovasculares Carlos III (CNIC) – Spain
- iXscient Ltd – UK
- Cellix Ltd – Ireland
- Lionix BV – Netherlands

Timetable: from 11/2012 to 10/2015

Total cost: € 4,175,431

EC funding: € 3,200,000

Instrument: STREP Project

Grant Agreement No.: 317916

Keywords:
Living photonics, biophotonics, cells, waveguide, ICT, healthcare, cardiovascular disease, CVD.

Figure 2: LiPhos Factsheet.

3.6. Project Flyer

A flyer is currently being designed, giving an overview of the project including the objectives and the consortium partners. This will be based on the Project Factsheet, but modified to be more suitable for professional printing and use as handouts by the partners at various dissemination events. It will also be available for download from the project website.

3.7. Project Website

An initial version of the LiPhos website was produced and placed on line during the first 3 months of the project (www.liphos.eu). The functionality is currently being extended and the website will be continuously updated throughout the project. It has a public area where non-confidential information on the project, its achievements, the partners, as well as important news on events and meetings are posted. In addition, it has a private section for the partners, controlled by a user name and password, where confidential information can be deposited and which allows the partners to update their profile and add further information to the public area. In future, the website will also adopt the Web Content Accessibility Guidelines (WCAG)©. WCAG offers documentation and guidelines to make web content accessible to people with disabilities.

The project website provides an excellent place to disseminate information. Currently there are the following dissemination routes on the website or expected imminently.

- Outline and objectives of the project
- Project news
- Project partners
- Project flyer – downloadable
- Public deliverables
- List of dissemination events past and future
- List of journal publications and conference presentations
- Links to similar technology developments
- Press releases



Figure 3: Screenshot of the LiPhos website.

3.8. Templates

The project has designed a number of templates following a particular style. This includes a Powerpoint presentation template that is to be used in all dissemination events. This will provide a uniform project image and ensure that the contribution of all partners and funding by the Commission is acknowledged.

3.9. Press Releases

Press releases will be considered at the appropriate stage of the project.

3.10. Dissemination through Masters Courses

Partners such as RUG, AU and DCU run Masters courses as part of their syllabus. For example, “Materials and Methods to perform Living Photonics”: seeding of aortic endothelial cells in LiPhos chips, parameters of the microfluidic conditions, setup of the LiPhos system (chip-source of light-spectrophotometer), registration of light scattering/absorbance from cell monolayers, interpretation of the spectrum collected from the project will be introduced in various graduate courses.

In the framework of the MSc course in Photonics (comprising the three main universities in Barcelona, namely UPC, UB and UAB), a topic on Photonic Lab on a Chip will be offered. This

course will cover aspects of polymer technology, microfabrication, microfluidics, white light spectroscopy and processing of biological samples.

Project dissemination in such courses will also occur by illustrating the course content with the application scenario of LiPhos, and by assigning to Master thesis students projects which are substantially inspired by the project. At RUG, a post-doc working on the project may supervise a few students during the course of the project. At AU, each year approximately 50 medical students have to do bachelor projects within cardiovascular pharmacology. Some of the students will write on endothelial dysfunction including subjects related to LiPhos.

4. Networking

Use will be made of contacts through commercial partners Cellix and Lionix, and this will be linked to future exploitation activities. Commercial contacts can also be established through:

- Demonstrations, booths or specialized symposia / workshops at selected conferences, as previously mentioned
- Organizing industrial workshops about the project, inviting selected EU parties and companies (as part of exploitation efforts)
- Direct approach to experts and companies active in the field (to be based on work to be performed in the exploitation part of LiPhos) such as:
 - Technology providers
 - End-users and companies in other relevant fields

Contact will also be made with other relevant EU projects during the course of LiPhos. Networking events organised or hosted by the European Commission, such as concertation meetings and workshops will be actively supported and exploited to make new contacts and assess opportunities for collaboration.

5. Training Strategy

To guarantee highest efficiency and best results in implementing the LiPhos workplan, researchers and industrial partners involved in LiPhos need an in-depth knowledge of relevant technologies and capabilities of other partners. To achieve this, an internal training plan will be adopted for researchers involved in the project.

Given the diverse range of technologies and know-how that will be exploited in LiPhos, training activities aimed at (a) providing new skills to researchers and (b) updating researcher skills will be organised. Due to the requisite for the progression of individual areas of expertise being the convergence of technologies, the need for researchers with a multi-disciplinarian background is of paramount importance. The structure of the LiPhos project will facilitate the exchange of researchers and students, not only within their field of expertise, but also to institutes and industries outside their field of expertise. The procedures for exchange will be agreed, additional funding opportunities identified and exchange opportunities promoted internally.

6. Conclusions

This document outlines the initial dissemination plans and opportunities for LiPhos. It is not intended that all details should be fixed at this early stage in the project, rather a framework has been laid and the partners will respond to dissemination opportunities which emerge. The area of living photonics is very exciting and at the forefront of current knowledge, with a lot of interest worldwide at the moment. It is clear that there will be extensive further opportunities for dissemination throughout the course of the project.